PATENT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Fred S. Cook	) Group Art Unit: 2441
Serial No.: 10/606,918	) Confirmation No.: 5738
Filed: 6/26/2003	) Examiner: Grant M. Ford
For: Compositional Service Resource Reservation	) Atty. Docket: 2182(16166)

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APPELLANT'S BRIEF ON APPEAL

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection of the Examiner dated March 16, 2009, rejecting claims 1-22.

REAL PARTY IN INTEREST

The real party in interest in the present appeal is Sprint Communications Company L.P., assignee of the entire right, title, and interest in the present application.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

The status of the claims is as follows:

Claims allowed: none.

Claims objected to: none.

Claims rejected: 1-22.

Claims withdrawn: none.

Claims canceled: none.

The claims being appealed are: 1-22.

STATUS OF AMENDMENTS

No amendment was filed after final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention provides compositional computing services based on virtual processing elements gathered into sets by an aggregator that links the elements together in a network traffic path. In particular, the invention adapts tools that have been used to manage network traffic in a manner that allows them to achieve desired data processing functions. Each virtual processing element has a capacity allocable according

to a respective communication transfer rate based on a sustainable data flow rate to complete respective data processing transactions.

Claim 1 defines the invention as a method of managing computer processing resources connected within a network (such as network 11 in Figure 1). A plurality of physical processing components are interconnected within the network for providing a plurality of virtual processing elements (steps 30 and 31 in Figure 4; page 7, lines 23-25) that are accessible by respective network traffic paths to perform a respective data processing operation on user-supplied data (page 4, line 25 to page 5, line 11). A pool of the virtual processing elements is represented using a resource aggregator (unit 20 in Figure 2; step 33 in Figure 4), each virtual processing element having a capacity allocable according to a respective communication transfer rate based on a sustainable data flow rate to complete respective data processing transactions on user-supplied data (page 4, line 29 to page 5, line 7). A reservation request is received for utilizing specified processing resources (step 35 in Figure 4; page 7, lines 28-29). The resource aggregator exclusively reserves at least one virtual processing element for providing capacity to satisfy the reservation request in response to the respective communication transfer rate (step 40 in Figure 4; page 8, lines 5-11). Use of a respective network traffic path is allocated to service the reservation request in response to the identified virtual processing element (step 41 in Figure 4; page 8, lines 11-13).

As defined in dependent claim 2, the plurality of virtual processing elements includes multiple component types for performing respective processing operations (page 5, lines 18-25).

As defined in dependent claim 3, the pool includes composite resource sets combining the respective processing operations to implement a predetermined composite service, each composite resource set being comprised of a plurality of the multiple component types (page 6, line 20 to page 7, line 7).

As defined in dependent claim 6, each of said composite resource sets further comprises at least one transport link within said network for connecting said multiple component types (page 7, lines 7-9).

Independent claim 10 defines a method of forming a compositional service within a network employing a plurality of physical processing components (12 and 13 in Figure 1). A plurality of physical processing components advertise to an aggregator their respective virtual processing components according to a plurality of component types for performing respective data processing operations on user-supplied data and advertise respective capacities of the virtual processing components (step 32 in Figure 4; page 7, lines 25-26). The virtual processing components are addressable within the network as respective virtual network elements to perform the respective data processing operations when receiving the user-supplied data (page 4, line 25 to page 5, line 11). The aggregator constructs a plurality of service resource sets from the virtual processing components according to a service type, each service resource set comprised of a combination of the virtual network elements (page 6, line 20 to page 7, line 7). The aggregator receives a reservation request from a remote user for utilizing resources according to the service type (step 51 in Figure 5; page 9, lines 3-4). The aggregator allocates a selected service resource set for fulfilling the reservation request (steps 55 and 56 in Figure 5; page 9, lines 10-14). The aggregator identifies the selected service resource set to the remote user (step 57 in Figure 5; page 9, lines 14-16).

As defined by independent claim 16, the invention is an apparatus for providing a data processing service. A network includes a plurality of transport links (page 5, lines 15-17; and page 3, lines 23-25). A plurality of physical processing components are connected within the network for advertising a plurality of virtual processing elements that are accessible by respective network traffic paths to perform respective data processing operations on user-supplied data (page 4, line 25 to page 5, line 11). Each virtual processing element has a capacity allocable according to a respective communication transfer rate based on a sustainable data flow to complete respective data

processing transactions on the user-supplied data (page 4, line 29 to page 5, line 7). A resource aggregator (20 in Figures 2 and 3) is connected within the network for representing a pool of the advertised virtual processing elements (step 33 in Figure 4), receiving a reservation request for utilizing specified processing resources (step 35 in Figure 4), exclusively reserving at least one virtual processing element for providing capacity to satisfy the reservation request in response to the respective communication transfer rate (step 40 in Figure 4), and allocating use of a respective network traffic path to service the reservation request in response to the identified virtual processing element (step 41 in Figure 4).

Independent claim 17 defines the invention as an apparatus for providing a compositional data processing service. A network includes a plurality of transport links (page 5, lines 15-17; and page 3, lines 23-25). A plurality of physical processing components are connected within the network for advertising respective virtual processing components according to a plurality of component types for performing respective data processing operations and advertising respective capacities of the virtual processing components (page 4, line 25 to page 5, line 11). The virtual processing components are addressable within the network as respective virtual network elements to perform the respective data processing operations when receiving the user-supplied data (page 4, line 29 to page 5, line 7). An aggregator constructs a plurality of service resource sets from the advertised virtual processing components according to a predetermined service type, wherein each service resource set is comprised of a combination of the virtual network elements for performing data processing operations required for the predetermined service type (page 6, line 20 to page 7, line 7), receives a reservation request from a remote user for utilizing resources according to the predetermined service type (step 51 in Figure 5), allocates a selected service resource set for fulfilling the reservation request (steps 55 and 56 in Figure 5), and identifies the selected service resource set to the remote user (step 57 in Figure 5).

None of the claims contain either a means plus function or a step plus function element.

GROUNDS OF REJECTION TO BE REVIEWED

1. Rejection of claims 1-7, 10-13, and 16-20 under 35 USC 103(a) as being unpatentable over Rawlins in view of Bruck.

2. Rejection of claims 8, 9, 14, 15, 21, and 22 under 35 USC 103(a) as being unpatentable over Rawlins and Bruck in view of Wright.

ARGUMENT

Rejection of Claims 1-7, 10-13, and 16-20 Under §103(a)

Claim 1

Claim 1 recites interconnecting a plurality of physical processing components within the network for providing a plurality of virtual processing elements that are accessible by respective network traffic paths to perform a respective data processing operation on user-supplied data. A pool of the virtual processing elements is represented using a resource aggregator, each virtual processing element having a capacity allocable according to a respective communication transfer rate based on a sustainable data flow rate to complete respective data processing transactions on the user-supplied data. A reservation request for utilizing specified processing resources is received. The resource aggregator exclusively reserves at least one virtual processing element for providing capacity to satisfy the reservation request in response to the respective communication transfer rate. Use of a respective network traffic path is then allocated to service the reservation request in response to the identified virtual processing element.

The final rejection relies on Rawlins as allegedly showing the interconnection of a plurality of physical processing components within the network for providing a

plurality of virtual processing elements that are accessible by respective network traffic paths to perform a respective data processing operation on user-supplied data. As known in the art and as apparent from Rawlins itself, routers do not perform processing, nor are they suggestive of processing, that meets these requirements. The "processing" done in a router relates to getting each particular packet of network traffic to its proper destination. The router does not perform any operations on user-supplied data (i.e., the data payload within the packet) as required by claim 1; nor does anything in Rawlins teach virtual processing elements having a respective data processing operation and being accessible by a respective network path. The clear meaning of "a plurality of virtual processing elements that are accessible by respective network traffic paths to perform a respective data processing operation on user-supplied data" is that by directing the user's traffic containing the user's data to the allocated network traffic path, the corresponding data processing operation is performed on the user's data. The final rejection fails to demonstrate prima facia obviousness of these features.

The invention aggregates respective network paths to join processing operations to compose a desired data service (i.e., each network path corresponds to a different data processing operation, and different data processing operations can be combined by allocating the appropriate network paths). Lacking these basic elements to combine (i.e., the virtual processing elements), the combination based on Rawlins fails to teach or suggest the claimed method.

The rejection argues that Rawlins shows the claimed pool of virtual processing elements using a resource aggregator, wherein each virtual processing element has a capacity allocable according to a respective communication transfer rate based on a sustainable data flow rate to complete respective data processing transactions on user-supplied data. However, Rawlins merely shows an edge router performing admissions control based on a comparison of requested bandwidth to that which is available in a pool. Since Rawlins is only performing network traffic control functions, there is no suggestion of pooling virtual processing elements which are allocable based on the data flow rate

that is used by the data processing function of the virtual element.

The rejection erroneously argues that Bruck also teaches a plurality of virtual processing elements that are accessible by respective network traffic paths to perform a respective data processing operation on user-supplied data. Bruck teaches a distributed gateway for performing failover and dynamic load balancing for increasing network availability (Abstract). If one of the machines in Bruck fails, it shifts traffic from the failed machine to an operational machine (col. 4, lines 21-29). The gateway function in Bruck can be distributed to servers with other operational functions (e.g., web server), but there is no teaching of any interaction between such functions. The incidental performance of a gateway function with some other function in Bruck would not lead one skilled in the art to make any modifications to Rawlins since Rawlins manipulates network traffic and does not perform the claimed data processing operations. The aggregation and allocation of network traffic paths to perform a data processing operation using virtual processing elements as claimed is neither shown nor suggest by the cited references. For the foregoing reasons, claim 1 is allowable and the rejection should be reversed.

Claim 2

Claim 2 recites that the plurality of virtual processing elements includes multiple component types for performing respective processing operations. Since Rawlins fails to show even one data processing operation, it likewise lacks multiple component types for respective processing operations. Rawlins performs addressing (i.e., routing) functions which are distinct from data operations as recited in claim 2. The final rejection fails to show any teachings in any prior art reference that establish the multiple component types. Therefore, the rejection of claim 2 should be reversed.

Claim 3

Claim 3 recites combining respective processing operations to implement a predetermined composite service. Rawlins and Bruck fail to compose a service of any data processing operations, and claim 3 is allowable. The mere citation of lines 13-54 in column 11 of Rawlins (which deals with allocation of network bandwidth) fails to provide the explanation required by *KSR* of a valid reason for concluding that combining respective data processing operations to implement a predetermined composite service would have been obvious The rejection should be reversed.

Claim 6

Claim 6 recites that each of the composite resource sets further comprises at least one transport link within the network for connecting the multiple component types. Since Rawlins clearly fail to disclose or suggest a transport link that connect multiple component types (i.e., respective types of processing elements), claim 6 is clearly patentable, and the rejection should be reversed.

Claim 10

Similar to claim 1, claim 10 recites respective virtual processing components according to a plurality of component types for performing respective data processing operations on user-supplied data, wherein the virtual processing components are addressable within the network as respective virtual network elements to perform the respective data processing operations when receiving user-supplied data. Therefore, claim 10 is allowable for the same reasons as discussed above regarding claim 1. In addition, claim 10 recites an aggregator constructing a plurality of service resource sets from the virtual processing components according to a service type, each service resource set comprised of a combination of virtual network elements. The final rejection fails to demonstrate valid reasons for concluding that one skilled in the art would have found the recited method as obvious. Rawlins and Bruck lack the virtual network elements and the

aggregation thereof. Thus, claim 10 is likewise allowable, and the rejection should be reversed.

Claims 16 and 17

Independent claims 16 and 17 recite apparatus that perform the functions as described above regarding claims 1 and 10. The "virtual processing elements that are accessible by respective network traffic paths to perform respective data processing operations on user-supplied data" are recited together with the other limitations discussed above. Therefore, claims 16 and 17 are allowable for the same reasons, and the rejection should be reversed.

Claims 4, 5, 7, 11-13 and 18-20

Claims 4, 5, 7, 11-13 and 18-20 are allowable for at least the reason that they depend from an allowable claim, and their rejection should be reversed.

Rejection of Claims 8, 9, 14, 15, 21, and 22 Under §103(a)

Claims 8, 9, 14, 15, 21, and 22

Since Wright fails to correct for the deficiencies in Rawlins and Bruck as shown above, claims 8, 9, 14, 15, 21, and 22 are allowable as depending from an allowable claim. The rejection should be reversed.

CONCLUSION

The final rejection has failed to establish a case of prima facie obviousness of any of claims 1-22. The prior art relied upon in the final rejection neither teaches nor suggests the structure or function of the present invention nor does it provide any teaching which can obtain the significant advantages which are achieved by the present invention.

Accordingly, the rejection contained in the final rejection dated March 16, 2009, should be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

Claims 1-22 now read as follows:

1. A method of managing computer processing resources connected within a network, said method comprising the steps of:

interconnecting a plurality of physical processing components within said network for providing a plurality of virtual processing elements that are accessible by respective network traffic paths to perform a respective data processing operation on user-supplied data;

representing a pool of said virtual processing elements using a resource aggregator, each virtual processing element having a capacity allocable according to a respective communication transfer rate based on a sustainable data flow rate to complete respective data processing transactions on user-supplied data;

receiving a reservation request for utilizing specified processing resources;

said resource aggregator exclusively reserving at least one virtual processing element for providing capacity to satisfy said reservation request in response to said respective communication transfer rate; and

allocating use of a respective network traffic path to service said reservation request in response to said identified virtual processing element.

2. The method of claim 1 wherein said plurality of virtual processing elements includes multiple component types for performing respective processing operations.

3. The method of claim 2 wherein said pool includes composite resource sets combining said respective processing operations to implement a predetermined composite service, each composite resource set being comprised of a plurality of said multiple component types.

4. The method of claim 3 wherein said respective processing operations within a composite resource set are characterized by predetermined interactions for integrating said processing operations into a service function.

5. The method of claim 2 wherein said processing operations include a data manipulation function and a storage function.

6. The method of claim 3 wherein each of said composite resource sets further comprises at least one transport link within said network for connecting said multiple component types.

7. The method of claim 1 wherein said network is comprised of an Internet protocol (IP) network and wherein said step of allocating use of a respective network traffic path is comprised of sending an IP message in a bandwidth reservation protocol.

8. The method of claim 1 wherein said network is comprised of an Internet protocol (IP) network and wherein said network traffic paths are comprised of label-switched paths.

9. The method of claim 1 wherein said network is comprised of an asynchronous transfer mode (ATM) network and wherein said network traffic paths are comprised of ATM virtual paths.

10. A method of forming a compositional service within a network employing a plurality of physical processing components, said method comprising the steps of:

a plurality of physical processing components advertising to an aggregator their respective virtual processing components according to a plurality of component types for

performing respective data processing operations on user-supplied data and advertising respective capacities of said virtual processing components, wherein said virtual processing components are addressable within said network as respective virtual network elements to perform said respective data processing operations when receiving said user-supplied data;

said aggregator constructing a plurality of service resource sets from said virtual processing components according to a service type, each service resource set comprised of a combination of said virtual network elements;

said aggregator receiving a reservation request from a remote user for utilizing resources according to said service type;

said aggregator allocating a selected service resource set for fulfilling said reservation request; and

said aggregator identifying said selected service resource set to said remote user.

11. The method of claim 10 wherein said processing operations include a data manipulation function and a storage function.

12. The method of claim 10 wherein each of said service resource sets further comprises at least one transport link within said network for connecting said virtual network elements.

13. The method of claim 10 wherein said network is comprised of an Internet protocol (IP) network and wherein said step of allocating said selected service resource set is comprised of sending an IP message in a bandwidth reservation protocol.

14. The method of claim 12 wherein said network is comprised of an Internet protocol (IP) network and wherein said transport link is comprised of a label-switched

path.

15. The method of claim 12 wherein said network is comprised of an asynchronous transfer mode (ATM) network and wherein said transport link is comprised of an ATM virtual path.

16. Apparatus for providing a data processing service comprising:

a network including a plurality of transport links;

a plurality of physical processing components connected within said network for advertising a plurality of virtual processing elements that are accessible by respective network traffic paths to perform respective data processing operations on user-supplied data, each virtual processing element having a capacity allocable according to a respective communication transfer rate based on a sustainable data flow to complete respective data processing transactions on said user-supplied data;

a resource aggregator connected within said network for representing a pool of said advertised virtual processing elements, receiving a reservation request for utilizing specified processing resources, exclusively reserving at least one virtual processing element for providing capacity to satisfy said reservation request in response to said respective communication transfer rate, and allocating use of a respective network traffic path to service said reservation request in response to said identified virtual processing element.

17. Apparatus for providing a compositional data processing service comprising:

a network including a plurality of transport links;

a plurality of physical processing components connected within said network for advertising respective virtual processing components according to a plurality of component types for performing respective data processing operations and advertising

respective capacities of said virtual processing components, wherein said virtual processing components are addressable within said network as respective virtual network elements to perform said respective data processing operations when receiving said user-supplied data; and

an aggregator for 1) constructing a plurality of service resource sets from said advertised virtual processing components according to a predetermined service type, wherein each service resource set is comprised of a combination of said virtual network elements for performing data processing operations required for said predetermined service type, 2) receiving a reservation request from a remote user for utilizing resources according to said predetermined service type, 3) allocating a selected service resource set for fulfilling said reservation request, and 4) identifying said selected service resource set to said remote user.

18. The apparatus of claim 17 wherein said processing operations from different component types include a data manipulation function and a storage function.

19. The apparatus of claim 17 wherein each of said service resource sets further comprises at least one of said transport links for connecting said virtual network elements.

20. The apparatus of claim 17 wherein said network is comprised of an Internet protocol (IP) network and wherein said aggregator allocates said selected service resource set by sending an IP message in a bandwidth reservation protocol.

21. The apparatus of claim 19 wherein said network is comprised of an Internet protocol (IP) network and wherein said one transport link is comprised of a label-switched path.

22. The apparatus of claim 19 wherein said network is comprised of an asynchronous transfer mode (ATM) network and wherein said one transport link is comprised of an ATM virtual path.

EVIDENCE APPENDIX

No evidence has been submitted under 37 CFR §§1.130, §§1.131, §§1.132, or otherwise.

RELATED PROCEEDINGS APPENDIX

There are no related proceedings and no corresponding decisions rendered.